

Attorney's Docket: 2002DE444Serial No.: 10/735,490Art Unit 1797Response to Office Action, Dated 10/31/2008

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Previously Presented) A fuel oil having improved filterability consisting of

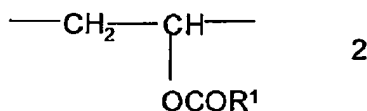
A) a proportion of mineral oil middle distillate or a proportion of mineral oil distillate and a mixture of fatty acid alkyl esters, said fuel oil having a sulfur content of at most 350 ppm, a total aromatics content of at most 22% by weight of said mineral oil middle distillate, and

B) a cold flow additive consisting of a proportion of at least one copolymer of ethylene and vinyl esters, said copolymer consisting of comonomers

a) bivalent structural units derived from ethylene of the formula 1

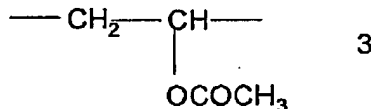


b) from 5 to 12 mol% of bivalent structural units of the formula 2



where R¹ is a saturated, tertiary-branched C₅-C₁₈-alkyl, and

c) from 4 to 13 mol% of bivalent structural units of the formula 3



wherein a sum of molar proportion of comonomers b) and c) is between 12 and 16 mol%, and,

d) up to 5 mol% of a further copolymer selected from the group consisting of olefins having from 3 to 18 carbon atoms, esters of acrylic acid or methacrylic acid with C₁-C₁₈-alcohols, C₁-C₁₈-alkyl vinyl ethers, and mixtures thereof, and

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- C) optionally at least one compound selected from the group consisting of a polar nitrogen compound, an alkylphenol-aldehyde resin, a comb polymer, a polyoxyalkylene derivative, and mixtures thereof, and
- D) optionally at least one additive selected from the group consisting of a dewaxing assistant, a corrosion inhibitor, an antioxidant, a lubricity additive, a dehazer, a conductivity improver, a cetane number improver, a sludge inhibitor, and mixtures thereof.

2.(Previously Presented)) The fuel oil of claim 1, wherein the molar proportion of the comonomer b) is between 5 and 11 mol%.

3.(Previously Presented) The fuel oil of claim 1, wherein the molar proportion of comonomer c) is between 4.6 and 9 mol%.

4.(Previously Presented) The fuel oil of claim 1, wherein the comonomer b) is a vinyl ester of branched carboxylic acids having from 5 to 15 carbon atoms.

5.(Canceled)

6.(Previously Presented) The fuel oil of claim 1, wherein the copolymer has a molecular weight (by GPC against poly(styrene)) of from 3000 to 15 000 g/mol.

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- 7.(Previously Presented) The fuel oil of claim 1, wherein the copolymer has a degree of branching determined by means of NMR between 2 and 9 CH₃/100 CH₂ groups, not taking into account the methyl groups of the comonomers.
- 8.(Previously Presented) The fuel oil of claim 1, wherein the copolymer has a melt viscosity at 140°C of from 20 to 10 000 mPas.
- 9.(Previously Presented) The fuel oil of claim 1, wherein the total aromatic content of the mineral oil middle distillate is below 18% by weight.
- 10.(Previously Presented) The fuel oil of claim 1, wherein the mineral oil middle distillate has a 90-20% boiling range of less than 110°C.
- 11.(Previously Presented) The fuel oil of claim 1, wherein the mineral oil middle distillate has a paraffin content by DSC of more than 3% by weight of precipitated paraffins at 10°C below the cloud point.
- 12.(Previously Presented) The fuel oil of claim 1, wherein the mineral oil middle distillate has a density of less than 0.840 g/cm³.
- 13.(Canceled)

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14.(Currently Amended) The fuel oil of claim 1, wherein the cold flow additive contains further consisting of at least one polar nitrogen compound.

15.(Currently Amended) The fuel oil of claim 1, wherein the cold flow additive contains further consisting of at least one alkylphenol-aldehyde resin.

16.(Currently Amended) The fuel oil of claim 1, wherein the cold flow additive contains further consisting of at least one comb polymer.

17.(Currently Amended) The fuel oil of claim 1, wherein the cold flow additive contains further consisting of at least one polyoxyalkylene derivative.

18.(Canceled)

19.(Currently Amended) A method for improving the cold flow behavior and filterability of a fuel oil consisting of

A) a mineral oil middle distillate or a mixture of mineral oil middle distillate and a mixture of fatty acid alkyl esters, said middle distillate having a sulfur content of at most 350 ppm, a total aromatics content of at most 22% by weight of said middle distillate, said method comprising adding to the fuel oil

B) a cold flow additive consisting of a copolymer of ethylene and vinyl esters, the copolymer of ethylene and vinyl esters consisting of comonomers

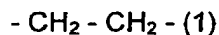
a) bivalent structural units derived from ethylene of the formula 1

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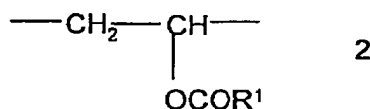
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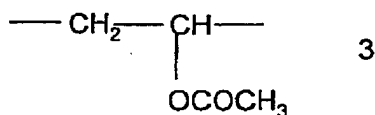


- b) from 5 to 12 mol% of bivalent structural units of the formula 2



where R¹ is saturated, tertiary-branched C₅-C₁₈-alkyl, and

- c) from 4 to 13 mol% of bivalent structural units of the formula 3



wherein a sum of molar proportions of structural units of the formulae 2 and 3 is between 12 and 16 mol%, and,

- d) up to 5 mol% of a further copolymer selected from the group consisting of olefins having from 3 to 18 carbon atoms, esters of acrylic acid or methacrylic acid with C₁-C₁₈-alcohols, C₁-C₁₈-alkyl vinyl ethers, and mixtures thereof, and

said fuel oil containing further consisting of

C) optionally at least one compound selected from the group consisting of a polar nitrogen compound, an alkylphenol-aldehyde resin, a comb polymer, a polyoxyalkylene derivative, and mixtures thereof, and

D) optionally at least one additive selected from the group consisting of a dewaxing assistant, a corrosion inhibitor, an antioxidant, a lubricity additive, a dehazer, a conductivity improver, a cetane number improver, a sludge inhibitor, and mixtures thereof

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said additive optionally ~~containing~~ further consisting of at least one compound selected from the group consisting of a polar nitrogen compound, an alkylphenol-aldehyde resin, a comb polymer, a polyoxyalkylene derivative, and mixtures thereof.

20.(Previously Presented) The method of claim 19, wherein the molar proportion of the comonomer b) is between 5 and 11 mol%.

21.(Previously Presented) The method of claim 19, wherein the molar proportion of comonomer c) is between 4.6 and 9 mol%.

22.(Previously Presented) The method of claim 19, wherein the comonomer b) is a vinyl ester of branched carboxylic acids having from 5 to 15 carbon atoms.

23.(Canceled)

24.(Previously Presented) The method of claim 19, wherein the copolymer has a molecular weight (by GPC against poly(styrene)) of from 3000 to 15 000 g/mol.

25.(Previously Presented) The method of claim 19, wherein the copolymer has a degree of branching determined by means of NMR between 2 and 9 CH₃/100 CH₂ groups, not taking into account the methyl groups of the comonomers.

26.(Previously Presented) The method of claim 19, wherein the copolymer has a melt viscosity at 140°C of from 20 to 10 000 mPas.

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27.(Previously Presented) The fuel oil of claim 19, wherein the total aromatic content of the mineral oil middle distillate is below 18% by weight.

28.(Previously Presented) The method of claim 19, wherein the mineral oil middle distillate has a 90-20% boiling range of less than 110°C.

29.(Previously Presented) The method of claim 19, wherein the mineral oil middle distillate has a paraffin content by DSC of more than 3% by weight of precipitated paraffins at 10°C below the cloud point.

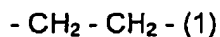
30.(Previously Presented) The method of claim 19, wherein the mineral oil middle distillate has a density of less than 0.840 g/cm³.

31.(Currently Amended) A fuel oil having improved filterability consisting of

A) a proportion of mineral oil middle distillate and from 5 to 25 % by weight of a mixture of fatty acid alkyl esters, said mineral oil middle distillate having a sulfur content of at most 350 ppm, a total aromatics content of at most 22% by weight of said mineral oil middle distillate, and

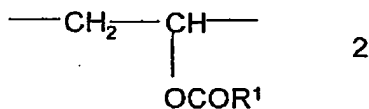
B) a cold flow additive consisting of a proportion of at least one copolymer of ethylene and vinyl esters, said copolymer consisting of comonomers

a) bivalent structural units derived from ethylene of the formula 1



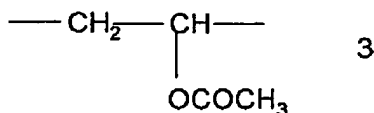
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- b) from 5 to 12 mol% of bivalent structural units of the formula 2



where R¹ is a saturated, tertiary-branched C₅-C₁₈-alkyl, and

- c) from 4 to 13 mol% of bivalent structural units of the formula 3



wherein a sum of molar proportion of comonomers b) and c) is between 12 and 16 mol%, and,

- d) up to 5 mol% of a further copolymer selected from the group consisting of olefins having from 3 to 18 carbon atoms, esters of acrylic acid or methacrylic acid with C₁-C₁₈-alcohols, C₁-C₁₈-alkyl vinyl ethers, and mixtures thereof, and

said fuel oil ~~containing~~ further consisting of

- C) optionally at least one compound selected from the group consisting of a polar nitrogen compound, an alkylphenol-aldehyde resin, a comb polymer, a polyoxyalkylene derivative, and mixtures thereof,
- D) optionally at least one additive selected from the group consisting of a dewaxing assistant, a corrosion inhibitor, an antioxidant, a lubricity additive, a dehazer, a conductivity improver, a cetane number improver, a sludge inhibitor, and mixtures thereof.

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32.(Previously Presented) The fuel oil of claim 1, wherein the mixture of fatty acid alkyl esters are derived from fatty acids having from 14 to 24 carbon atoms and alcohols having from 1 to 4 carbon atoms.

33.(Previously Presented) The fuel oil of claim 1, wherein the mixture of fatty acid alkyl esters is selected from the group consisting of rape seed methyl ester and mixtures of rape seed methyl esters and further vegetable oil esters.

34.(Previously Presented) The fuel oil of claim 1, wherein the mixture of fatty acid methyl esters comprises rape seed methyl esters.